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Investigation of Sediments from New York Harbor Using Fourier Transform Infrared Radiation (FTIR)

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ABSTRACT: Sediments in the NY/NJ are contaminated with trace amounts of polynuclear aromatic hydrocarbons (PAH's), polychlorinated biphenyls (PCB's) dioxins, furans, and metals from different anthropogenic sources. The sediments also include substantial amounts of other organic materials that comprise approximately 1-10% of the sediment mass. These materials include both naturally occurring compounds and anthropogenic compounds. Cleanup of the sediments using sediment washing with high pressure water jets combined with extraction using chelators and surfactants is presently undergoing testing as part of project sponsored by the U.S. Environmental Protection Agency and the State of New Jersey Office of Maritime Resources. The objective of this work is to evaluate differences between the organic compounds found in untreated sediments, humic and fulvic acid standards as representative if natural organic compounds, and those in the cleaned sediments. During the present reporting period, we have measured several sediment samples from New York Harbor, San Diego Bay, and the Venice Lagoon as well as humic and fulvic acid standards prepared by the International Humic Substances Society. Substantial differences were found when the spectra for the New York Harbor sediments were compared with the spectra found for the standards. This indicates that the organic materials found in the sediments are dominated by organic compounds of anthropogenic origin. Maps of these materials also show that there is a substantial heterogeneity in the sample composition. Analyses of the data to delineate differences in the chemical structures is now in progress.